

On the Growth of Hair upon the Human Ear, and its Testimony to the Shape, Size, and Position of the Ancestral Organ<sup>1</sup>. By H. M. WALLIS.

[Received January 23, 1897.]

(Plates XIX.-XXII.)

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i. *Literature of the Subject.*

In 1871, Darwin called attention to the cusp sometimes seen upon the folded edge of the human ear and suggested that this feature was a survival of the pointed tip which terminated the ear of our remote ancestor<sup>2</sup> (see figure, p. 299).

The hypothesis was ingenious, but less convincing than many of the bold and splendid deductions of our great philosopher. Support from corroborative phenomena was needed, but none was forthcoming. Indeed, had this identification stood alone, it would hardly have commanded acceptance; but making its appearance in good company amidst a phalanx of marshalled facts, which there was no gainsaying, it obtained an amount of credence which was scarcely deserved.

In Germany, Ludwig Meyer<sup>3</sup> and, more recently, C. Langer<sup>4</sup> have thrown doubt upon Darwin's interpretation of the cusp in question. But although this cusp is sometimes triple, frequently double, and still more frequently absent altogether—variations which, to say the least, do not uphold Darwin's view—the current of intellectual opinion has borne the Theory of Natural Selection into favour and this item has travelled with the rest.

Although for nearly a generation no fresh light has been thrown upon this particular question, yet for years past the cusp has been labelled "Darwin's Point" upon diagrams and museum preparations; the correctness of his identification has been generally assumed and the matter treated as settled.

This, however, was not Darwin's opinion, as will presently appear.

In July 1879 my attention was drawn to the ears of a new-

<sup>1</sup> Communicated by Prof. E. B. POULTON, F.R.S.

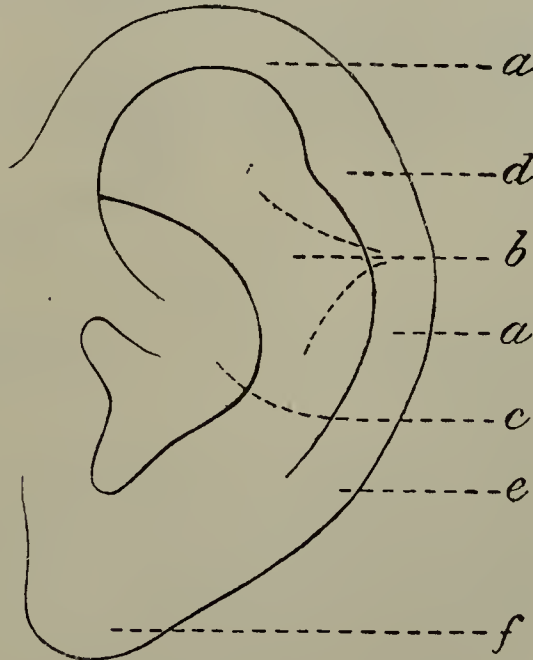
<sup>2</sup> 'Descent of Man,' 1871, i. p. 22.

<sup>3</sup> Ludwig Meyer, 'Ueber das Darwin'sche Spitzohr,' Berlin, 1871.

<sup>4</sup> C. Langer, "Ueber Form und Lageverhältnisse des Ohres," Mit. d. anthropol. Gesellsch. in Wien, xii. 1882.

born child. He was of a dark complexion and hirsute; the edges of his little ears were fringed with black hairs showing conspicuously upon the delicate skin of infancy.

The direction, or set, of these hairs surprised me. Instead of radiating from the margin of the ear like the cogs of a wheel, or overlapping one another around its edge like the teeth of a ratchet, two streams of hairs approached each other from almost opposite directions until their points crossed and interlaced (see Plate XX. figs. 9, 10, 18, &c.).



Normal Human Ear.

*a a*, helix; *b*, anti-helix; *c*, concha; *d*, Darwin's point, *e*, spina heliis; *f*, lobe.

The part of the *helix* at which the points of the hairs met was that part of the infolded outer rim which is normally somewhat thickened and where a little white nodule is frequently present, the nodule which in later life commonly develops into Darwin's Point. I communicated my discovery to Mr. Darwin and received from him the following letters, now, by permission of his son Mr. Francis Darwin, published for the first time:—

I.

March 22nd, 1881.

Down,  
Beckenham, Kent.

Mr. H. M. Wallis.

DEAR SIR,

I am very much obliged for your courteous and kind note. The fact which you communicate is quite new to me, and as I was

laughed at about the tips to human ears, I should like to publish in *Nature* some time your fact. But I must first consult Eschricht<sup>1</sup> and see whether he notices this fact in his curious paper on the *lanugo* on human embryos; and, secondly, I ought to look to Monkeys and other animals which have tufted ears and observe how the hair grows. This I shall not be able to do for some months, as I shall not be in London until the autumn, so as to go to the Zoological Gardens. But in order that I may not hereafter throw away time, will you be so kind as to inform me whether I may publish your observation, if on further search it seems desirable. If you give your permission, may I say that "Mr. Wallis, on carefully examining the ears of an infant, observed that the hairs were directed, &c. &c. &c."

Or, would you prefer my saying that "a gentleman, on carefully examining, &c. &c." Will you be so good as to send me a line in answer, and I remain,

Dear Sir,

Yours faithfully,

CHARLES DARWIN.

II.

March 31st, 1881.

Down,  
Beckenham, Kent.

Mr. H. M. Wallis.

DEAR SIR,

I am much obliged for your interesting letter. I am glad to hear you are looking to other ears, and will visit the Zoological Gardens. Under these circumstances it would be *incomparably* better (as more authentic) if you would publish a notice of your observations in *Nature* or some scientific journal. Would it not be well to confine your attention to infants, as more likely to retain any primordial characters, and offering less difficulty in observing?

I think though it would be worth while to observe whether there is any relation (though probably none) between much hairiness on the ears of an infant and the presence of the "tip" on the folded margin.

Could you not get an *accurate* sketch of the direction of the hair of the tip of an ear?

The fact which you communicate about the Goatsucker is very curious. About the difference in the power of flight in Dorkings, &c., may it not be due merely to greater weight of body in the adults?

I am so old that I am not likely ever again to write on general and difficult points in the theory of evolution.

I shall use what little strength is left me for more confined and easy subjects.

Pray believe me with all good wishes, Dear Sir,

Yours very faithfully,

CHARLES DARWIN.

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<sup>1</sup> Eschricht, D. F., Om Haarenes Retning paa det Menneskelige Legeme (8vo, Kiøbenhavn, 1838), is probably the work referred to.

From the terms of the foregoing it may be assumed that Mr. Darwin recognized the significance of this discovery and was conscious of the hiatus in the structure of his theory into which this little fragment of corroborative fact could be fitted.

Beyond their scientific interest these letters have an ethical value of their own, revealing the generous courtesy to a stranger and the plastic receptivity of mind in extreme old age that we must ever associate with the greatest intellect among the moderns.

Thus encouraged by Mr. Darwin I have for the past sixteen years observed the ears of infants and induced others to do so.

My attention was drawn to an interesting paper, published by an Italian, G. Chiarugi<sup>1</sup>, about ten years ago (catalogued in England in 1889), but which has received so little attention, either here or on the Continent, that Wiedersheim<sup>2</sup> does not allude to the subject.

Signor Chiarugi's paper is a three-page pamphlet of which only the concluding forty-five lines relate to the subject under discussion.

The following is a free translation :—

“It is not then because good reasons are wanting [*to support Darwin's view of the origin of the “point.”—H. M. W.*] that I have decided to indicate a new character which attests the significance attributed by Darwin to the tubercle of the *helix*, but because the fact is such that it might by itself indeed cut short all discussion.

“The external ear (*padiglione*) is provided with rudimentary hairs, which in the adult are very fine and pale and which creep sometimes into the hollow of the auditory cavity, which claim no attention at all; but in the foetus and in the baby at birth, and for a certain time after, they are fairly long, numerous, and frequently pigmented.

“Their direction differs in different parts of the external ear. On the outer surface they have in general an ascending direction, somewhat varied here and there by the varying curvatures of the ear.

“They preserve such a direction near the outside margin, upon which along the first third [*of its length.—H. M. W.*] starting from the front (upper margin) they turn their points downwards; along the other two-thirds (hinder margin) they turn their points directly upwards.

“Upon the internal surface<sup>3</sup> of the outer ear (*padiglione*) the hairs (*peli*), continuing the direction of the hairs (*capelli*) growing upon the adjacent hairy scalp, incline downwards. You

<sup>1</sup> “Il Tubercolo di Darwin e la Direzione dei Peli nel Padiglione dell' Orecchio umano.” Estratto dal Bollettino della Sezione dei Cultori delle Scienze mediche nella R. Università dei Fisiocritici di Siena: Anno vi. fasc. ii. (1889?).

<sup>2</sup> ‘Structure of Man,’ Wiedersheim. Macmillan, 1895.

<sup>3</sup> The context shows that Signor Chiarugi means the *back* of the ear, *i. e.*, the surface next the head.—H. M. W.



see them projecting in this direction on all parts of the ear which adjoin the line of insertion [*to the head.*—*H. M. W.*] and upon the outside answering to the convexity of the *concha*; but away from there, if you set aside the upper part of this internal [*sic*] surface, where the hairs come from the front [*sic*] to the back, we see on the remaining [*portion*] the hairs turn obliquely little by little from a downward direction to the outside, so that in the turn inwards [*sic*] to the posterior tract of the free margin, they become pointed upwards, as we have seen already.

“From what we have said it will be easily understood that the free margin of the outer ear is traversed by two currents of hairs—one which follows the upper tract (or first third) bending downwards; the other which follows the hinder tract, or remaining two-thirds of its free margin, bending upwards.

“At the junction of the upper tract with the lower the two currents meet, and together with hairs coming straight from the hinder surface, sometimes form a true little tuft (*ciuffetto*), the spiral twist upon its convexity being plainly to be observed.

“Well, now, what seems worthy of note is, that when Darwin’s Tubercle is present, this meeting of the two currents of hairs is placed in correspondence with it. And since in the ears of animals that have hairy ears it is towards the point that the hairs are turned, it seems definitely resolved that Darwin’s Tubercle is, as Darwin put it, the rudiment or trace of originally pointed ears.”

## ii. *Ears of Infants.*

Leaving now the historical *résumé*, I proceed to describe some observations which prove that the hairs upon an infant’s ear are arranged upon a definite plan and have different directions in different parts of the organ.

To begin with, the back of the ear at birth is frequently clothed with a regular growth of hair. The possible significance of this will be dealt with later. For the moment, however, I merely draw attention to the peculiarities of the growth, its constant adherence to certain lines—both on the back of the *concha*, where the hairs are directed backwards and downwards (as may be seen by reference to Plate XIX. figs. 2 and 3); and upon the back of the *helix* and *anti-helix*, where the lines of growth followed by the hair, though in my experience constant (when hair is present at all), are apparently capricious, a question to be dealt with presently.

Fig. 3 shows the back of an infant’s ear enlarged. The tract immediately around Darwin’s Point, or where Darwin’s Point is to be expected (for it is not always present), is bare. Those parts of the *helix* which are above the bare tract are clothed back and front with hairs directed towards Darwin’s Point, whilst the hairs upon the back of the *anti-helix* separate themselves from those upon the back of the *concha*, which are directed downwards towards the lobe, and executing a countermarch, as one might say, come

curving round the infolded rim of the *helix* below Darwin's Point, directing their growth towards it until their tips meet and touch those of the hairs approaching from above (see Plates XIX. & XX. figs. 2, 3, 11, 13, and 19).

The significance of this countermarch or reversal of direction it is proposed to discuss later in this paper.

The opposing growths of hairs do not approach one another from directly opposite directions; they cross one another's paths diagonally, as though seeking something which was once there, but which no longer exists.

Figs. 1, 2, and 3 are well-marked cases. On many infant ears Darwin's Point is not sufficiently pronounced to enable its precise locality to be determined. Its position varies much in my experience, and the tract around it, or its presumed site, is very frequently bare, as already remarked. In short, the external infant ear is a very variable organ, but whenever hair is present it seems to follow the above-described lines, although it may be almost invisible and need a dark card to be placed between the ear and head and the use of a lens to discover the hairs.

I have observed a case where an infant's ear showed Darwin's Point well and the small white tubercle beneath the skin was marked by a minute tuft of down.

The ear drawn in fig. 1 was so noticeable that the child's mother, a woman in humble circumstances, was struck by its appearance and sent for me to see it. Where the two streams of hairs met the hairs were longest, a distinct tuft of hairs twisted upon one another came partly from behind the ear and partly from the fold of the *helix* and projected laterally at right angles to the median line of the body from one-eighth to one-quarter of an inch. The *spina heliois* was thickly clothed with hairs pointing towards this tuft. The child was a fair-skinned infant with very dark brown hair.

In but one case have I examined an ear completely at variance with this rule. It is upon a foetal head in spirit in the Oxford University Museum. No Darwin's Point is discernible and the growth of hair follows an unbroken sequence round the *helix*. This head however is abnormal in other respects, one cranium growing out of another, so that it is difficult to say what importance should be attached to it. My observations of foetal ears have so far been inconclusive. Of some the epidermis seems imperfectly developed and is hairless. In no case are very small hairs easily observed whilst the subject is immersed, and when removed from the spirit the *lanugo* clings to moist skin and it is difficult to determine the direction of its natural growth.

The Darwin's Point was not well marked, or indeed determinable, upon most of the foetal ears which I have examined; but no stress need be laid upon this, as this feature is very variable and frequently absent, as is well known. One foetal ear was remarkable for having Darwin's Point directed backwards (the *helix* being unfolded as in Monkeys), and this point was tufted with small pale

yellow hairs. This is a specimen in spirit in the Oxford University Museum.

### iii. Ears of Adults.

In life this infantile growth is soon shed, but in later middle age a hairy covering sometimes reappears and may be noticed in black-haired men of coarse skin and hirsute habit of body more frequently than in others, although I have recently observed the ears of a man of about forty, fresh complexioned, dark red moustache, pale red hair, which exhibited almost all the phenomena I have described. The hairs, which were straw-coloured and very numerous, grew thickly upon the backs of the ears, fringed the edges of the *helix*, and had well-marked lines of growth.

I transcribe from my notes the following particulars of a case (see Plate XIX. figs. 4, 5):—"T. F., *ætat. circa* 44. Dark, hirsute, bilious temperament. Hair of face, head, hands, and wrists black. That upon the *helix* is soft, pale, and fine: it converges from both sides (above and below) upon a well-marked Darwin's Point, but does not cross tips at that point, nor is there a tuft there. Thicker hairs clothe the lower part of the *anti-helix*, and, pointing downwards at first, follow one another round the edge of the *spina helicis*, and changing their direction point upwards towards Darwin's Point. The phenomenon was better defined upon the left than upon the right ear. The subject was restive and difficult to examine. The sketch was completed at some personal risk."

Another instance (Plate XIX. figs. 6 & 7) is the ear of a dark-skinned black-haired man of about fifty, of a similar type, remarkable as having eyebrows of unusual fullness, each down-curving in a tuft of bristles, the longer of which are fully two inches in length. The moustache full and black, inclining to grey. The ears were large and well-shaped, Darwin's Point easily located. The back of the ear covered with pale down made up of minute hairs, the whole edge fringed with small pale hairs with distinct direction, the two growths meeting and crossing tips on the outer edge of the *helix* close to Darwin's Point. Besides these almost colourless hairs there was a strong growth of pale brown hair, one inch in length, upon the *spina helicis* directed upward and backward in the main, and a more characteristic growth upon the upper edge of the *helix* of dark half-inch bristles curving strongly and regularly around its edges towards Darwin's Point. In this, as in the case of figs. 4, 5, and the case of the red-haired person, the hairs upon the ears were all paler than those upon the head.

This phenomenon is not rare; any good observer will meet with instances among his acquaintance; but though well-marked examples are not uncommon, they are usually disinclined to lend themselves to research.

The majority of ears, whether of adults or of children other than infants, show no hairs, or where a weak and straggling growth has persisted in spite of constant friction and depilatory influences, there is seldom any visible direction or "set" traceable.

iv. *Ears of Quadrumana.*

In the hope of discovering the law of growth followed by these hairs the ears of various Apes and Monkeys have been examined.

The drawings for figs. 20-37 (Plates XXI. & XXII.) were made at different times and in most cases under circumstances which made a common scale impossible, for specimens sealed up in bottles cannot readily be measured, nor will some Monkeys endure handling. Fig. 32 was drawn from a Monkey upon an organ in the street, and I have no idea of its scientific name. The ear of the Aye-Aye (*Cheiromys*), fig. 37, was drawn from a skin. As a rule I have not trusted to skins, the ears upon which are apt to contract in drying; their true shapes and positions must then be matters of conjecture and the original direction of the hairs upon them is not preserved.

The ear of *Hylobates hoolock* (fig. 20) is imbedded in deep black fur and hardly visible to casual observation. It is as nearly naked as can be, having few, if any, traces of hair or down upon the smooth black skin of the back of the *concha* and *helix*. Upon the folded margin of the upper edge of the ear are a very few fine hairs of no describable colour directed towards the region where the point of the ear presumably once was, for no trace of a point, cusp, or nodule remains. This ear is sessile, fitting closely to the head.

*Orang.*—The ears of a young male specimen dried and salted in the collection of the Zoological Society were hairless. The head, trunk, and limbs were covered with long red hair.

*Troglodytes calvus* ("Sally").—As figured by Mr. F. E. Beddard in his monograph, the ears of this species are hairless and show little or no indication of a point.

*Troglodytes niger* (fig. 21, 22, 23).—The ears of young Chimpanzees in the Zoological Gardens, 21 and 22, have no indications of any point, a very few small hairs upon the upper fold and a few more upon the lower edge directed towards one another as is usual. Backs almost hairless.

Fig. 23.—An ear in spirit in the Oxford University Museum showed no rudimentary point and bore a few fine hairs upon the upper fold only; direction as usual. I could not examine the back.

The ears of a Gorilla in the same museum (figs. 24, 25) showed some faint indication of a point towards which the small hairs were directed. In the immediate neighbourhood of what I took to be the rudimentary point the hairs were fewest and their direction most indefinite. The hairs upon the folded margin of the *helix* curled inwards as in the human ear and the few stronger and darker hairs upon the back of the upper ear pointed towards the edge.

*Cynocephalus* (fig. 26).—This has a distinct though blunt point which is bare. The hairs upon the folded upper *helix* are directed strongly to this point, those which fringe the lower *helix* are less noticeably directed.

Almost the same remarks apply to the ear of *Cercopithecus cynosurus* (fig. 27).



*C. albigularis*.—Is bluntly pointed and plentifully fringed; the hairs cross tips at the point. Back of ear nude (fig. 28).

*C. petaurista*.—Distinct, sharp, nude point; fringe of hairs directed to it. Short curving hairs upon the back, such as one finds upon the back of a baby's ear (fig. 29).

*C. lalandii*, Juv.—Less hairy, same general characters. Tiny tuft of darker hairs at the tip, and a few on back of ear point towards the tip (figs. 30, 31).

Monkey, sp.?—Ear fringed with converging growths. Point definite and tufted with slightly longer hair (fig. 32).

*Macacus maurus* (fig. 33).—A very bestial ear; upper *helix* folded and hairy; strong dark hairs from all parts of the ear converge towards a definite point and crossing there form a noticeable tuft.

Lemur, sp.? (fig. 34).—Drawn from a specimen in spirit in the Oxford University Museum. A distinctly infolded *helix* with hairy back; no point or tuft.

Ringed-tailed Lemur (fig. 35).—In same collection. A simple discoidal ear, margin fringed near junction with head; back hairy, no trace of point.

Loris (*Nycticebus tardigradus*), fig. 36.—Is so abundantly and softly furred as to be difficult to draw; back of ear furry, with but little definite "set." No indication of infolding, no point or terminal tuft.

Aye-Aye (*Cheiromys*), fig. 37.—A simple bestial ear, not quadrumanous in character, almost naked, sparsely clothed inside with fine black hair directed to the tip, outside coarser and fewer black hairs tipped with white are similarly directed. No fringe or tuft; no point. Root of ear (*concha*?) thickly clothed with divergent hairs pointing fanwise towards the circumference of the ear.

Whilst contemplating a series of forms such as these it is possible to follow in imagination the progressive degradation of the external ear from a condition in which it was mobile and of the utmost importance to its possessor to a state in which it ceases to be functional.

The presumably conspicuous leaf-shaped organ of some common ancestor of the Aye-Aye, the Lemurs, and ourselves has dwindled to a mere crumpled excrescence in the Gibbon, sans lobe, sans point, sans hair, sans everything!

An ordinary human ear occupies an intermediate position, although variations in the direction of a simian type may be found in which the *helix*, or lobe, or both are wanting, whilst others show a pitheciine cusp directed laterally or even backwards.

The testimony of the convergent hairs to the origin of this cusp is so confirmatory of the view enunciated by Darwin that from henceforth the fact of our ancestors having had pointed ears may be regarded as established.

#### v. *Shape, Position, and Movements of the Ancestral Ear.*

Is it possible from the phenomena under discussion to deduce

anything as to the shape, position, and movements of the ancestral ear?

As to shape, it seems unlikely that the ear was obtusely pointed as in *Loris* and *Cynocephalus*, for had not the point been originally at least as sharp as it is in *Macacus* it would hardly have persisted until now.

As to position and mobility: was the ear pressed as closely to the head as in most living Apes, and had it as little mobility as theirs?

Darwin ascertained<sup>1</sup> that neither the Orang nor the Chimpanzee ever erects or moves its ears. I have seen *Macacus maurus* move its ear slightly, and some men retain this power, although it is questionable whether this movement is due to the extrinsic muscles of the organ, as Darwin appears to have believed<sup>2</sup>, or to the contraction of the scalp. It is certain that beyond the power possessed by many persons of moving their ears simultaneously with their eyebrows and the skin of the nape, some few can move the whole ear quite independently of the scalp; and I have observed a case in which the upper half of the ear could be vibrated at will, either rapidly or slowly, whilst the lobe and lower half of the same organ, the eyebrows, and scalp remained motionless.

Whether these movements are due to the muscles of the ear or no, such muscles exist in Man, and their existence argues past use in our ancestral form. As a matter of fact the external ear in both Man and the Quadrumana is an atrophied organ in several respects, mobility for one. But evidence of mobility is foreign to the present enquiry except as affording concurrent testimony as to the conditions of the ancestral ear, which almost certainly moved freely. A freely moving ear must needs project, and a projecting ear is exposed and seems to require (and usually possesses) a special hairy covering of its own. To-day the normal human ear is almost hairless, frequently indeed quite nude. It is practically sessile. Whether at one time it projected laterally seems a fair subject for investigation, and to this question the existence of hairs upon its back affords a clue.

Where the ear is pressed closely to the head as in most of the Quadrumana, its back is almost naked: it was quite bare in the Gibbon which I examined. An ear thus placed is obviously protected from weather either by the fur in which it is embedded, as in the Gibbon, or by the long tresses which fall over it from the sides of the head in the Orang and Chimpanzee<sup>3</sup>. Even the thick short bristly hair of the Gorilla affords an efficient protection, and it is not easy to get sight of the back of its ears, even when the ear is handled. A special hairy covering for an ear so placed is needless, a tuft in the orifice to exclude rain being all that is needed and usually all that exists. Except a very few weak hairs in Gorilla, the Anthropoids have lost the hair upon the back of the ear so far as my observations extend, which is not far, for Anthropoid Apes

<sup>1</sup> 'Descent of Man,' 1871, i. p. 21.

<sup>2</sup> *Ibid.* p. 20.

<sup>3</sup> *Trogodytes calvus*, as its name implies is bald.

are neither abundant nor easy to examine. Their ears seem subject to much variation.

Man alone exhibits in infancy and reproduces in later life the ancestral hairy coat of the ear—a fact from which we may perhaps infer that at one time his ears had sufficient lateral projection to need other and more constant protection from the weather than the hair of the scalp afforded.

The shape of the head of our ancestor who had pointed ears is not known, but it is highly improbable that his skull was of the lofty, domed, Caucasian type. If it were long and low, somewhat after the style of the Eocene *Adapis*, the ears would be set much higher in the head than ours, and would get no protection from any hair growing upon the scalp.

Several contributory pieces of evidence suggest that the external ear is an organ diminished by disuse. Thus, it is no longer functional; it varies extremely and constantly in shape and size and in other particulars. It is by its position exposed to sunburn, frost-bite, and injuries of all kinds, yet it is ill-supplied with nerves of sensation and has a poor supply of blood. Consequently it heals slowly when cut. One might compare our external ear to an outpost once important, but now no longer essential, from which the garrison is withdrawing.

My friend Dr. Hurry, of Reading, points out that the hairs on the ears of both dark-haired and red-haired persons, already referred to, are lighter than the general tone of the hair of the head and cheeks. He suggests that this may result from some deficiency of colouring-matter, which is in itself one process of degeneration. I have, however, too little evidence on this point to warrant my doing more than indicating a line worthy of further enquiry.

But evidences of degeneration are, for the purposes of this enquiry, negative testimony; let us seek for something positive as a clue to ancestral shape and size.

The most puzzling feature seems to be the abrupt countermarch of the hairs upon the back of the *helix*. No anthropoid or other quadrumanous animal, so far as my limited observations extend, shows anything analogous. The arrangement is useless, is not ornamental, but is so persistent that one is driven to believe that its history, if decipherable, would throw light upon the condition of the organ in past times.

The theory which I propound upon this growth is submitted with extreme diffidence.

This countermarch is in its incipience simply a divergence or radiation of the lines of growth of the hair, such as is found upon all funnel-shaped hairy ears where the diameter increases outwards from a short tubular *concha* to a larger expansion. This radiation is found among the hairs on the back of the human ear, the growth starting spirally at the junction of the head and *concha*, and diverging outwards, some to the one side of Darwin's Point, some to the other (see Plate XIX. figs. 2 & 3).

The divergence is easily explained, but the subsequent convergence requires consideration. The convergence of the hairs, as the curl in the *helix* is reached, suggests (as other phenomena have already suggested) that this infolded rim is an atrophied feature, the most degenerate part of a degenerate organ. It would seem that this fold is all that survives of a subdiscoidal or funnel-shaped organ of considerable size and projection.

As in the course of ages this extension contracted and became folded back upon itself into the *helix* which we now know, the once divergent lines of growth upon its back would be crowded together as the lines of longitude upon a globe draw together after passing the equator. Or, taking the wrist to represent the *concha* and the extended thumb and fingers the lines of growth of the hairs upon the ancestral ear, partial closure of the hand bringing the five finger-tips into proximity will roughly illustrate the supposed phenomena of distortion.

That the distortion is greatest below Darwin's Point suggests that the ear has sustained its greatest loss of surface on that side; and this interpretation is in some sort supported by the fact that all, or most, Monkeys which have pointed ears show the point higher than we show our rudiment.

The great size of the ancestral ear may be inferred from the still considerable dimensions of its atrophied successor; and if the above explanation of the countermarching hairs is correct, the amount of their convergence argues a very considerable extent of ear at one time protruding beyond the present limits of the *helix*.

It has, I believe, been generally suspected that the line of human descent runs somewhat wide of any living anthropoid, and in this view the phenomena of the ear agree.

#### vi. *Summary.*

The human external ear is more ancestral than that of any known Ape; more bestial than the almost naked ears of the Anthropoids, which show little or no trace of any point; more bestial even than the bare bluntly-angled ear of the Dog-faced Baboon. There are characters apparently peculiar to itself which need reference to such early forms as *Nycticebus* and *Cheiromys* before their significance can be appreciated.

A large and somewhat funnel-shaped ear, sharply pointed and projecting widely from the head, and with sufficient powers of motion to permit of its being pricked, shaken, and laid at will, seems within the vista of possibilities opened up by the phenomena just described.

We may perhaps go one step further and reasonably infer the back of this ear to have been thickly clothed with hair, longer upon the *concha*, shorter upon the *anti-helix* and *helix*, and that it was fringed with stronger and darker hairs which united at the point in a conspicuous spirally-twisted tuft.



## EXPLANATION OF THE PLATES.

## PLATE XIX.

*Ears of Man, adults and infants.*

- Fig. 1. Left ear of girl at 36th day after birth; front and back views; enlarged.  
 2. Right ear of infant girl, back view; enlarged. *a*, base; *b*, thick growth.  
 3. Left ear of same child, back view; enlarged. *a*, base; *b*, thick growth.  
 4. Left ear of adult, front view.  
 5. Left ear of adult, back view.  
 6, 7. Right ears of adult, front views.

## PLATE XX.

*Ears of Man, infants.*

- Fig. 8. Ear of infant 4 days old; hairs meet at *a*.  
 9. Same seen from above showing hairs crossing and small tuft.  
 10. 6 days old; hairs cross at *b*.  
 11. Nodule at *c*, hairs meet there.  
 12, 13. Under 1 month, hairs converge on *d*, and cross.  
 14, 15. 10 days old.  
 16. 2 days old, much fine white hair, longest upon back of ear and on edge of helix; hairs meet at *c*; no cusp.  
 17. 5 months old; hairs converge from *f, f*, Darwin's Point bare, *g*.  
 18. Hairs cross on inner edge of helix, *h*.  
 19. 10 days old.

## PLATE XXI.

*Ears of Anthropoid Apes.*

- Fig. 20. Ear of Hoolock Gibbon showing a few hairs (*a*); no hairs on the back of the ear.  
 21. Ear of Chimpanzee, ♂ jr.  
 22. Ear of do. *b, c*, hairs converging; no cusp.  
 23. Ear of do. *e*, hairs.  
 24, 25. Ear of Gorilla, jr.; *d*, Darwin's Point? Hairs on margin numerous and definitely directed towards *a*.

## PLATE XXII.

*Ears of Monkeys and Lemurs.*

- Fig. 26. Ear of *Cynocephalus*.  
 27. Ear of *Cercopithecus cynosurus*.  
 28. Ear of *C. albicularis*.  
 29. Ear of *C. petaurista*.  
 30, 31. Ear of *C. talandii*, jr.; front and back views.  
 32. Ear of Monkey, sp. inc.  
 33. Ear of *Macacus maurus*, hairs from both back and front converge upon *a*, and cross points there.  
 34. Ear of Lemur, sp. inc.  
 35. Ear of Ring-tailed Lemur.  
 36. Ear of Loris.  
 37. Back of left ear of Aye-Aye.